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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/765,852	Applicant(s) SATO ET AL.	
	Examiner Justin E. Shepard	Art Unit 2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-9,11-17,19-31,33-39 and 41-44* is/are rejected.

7)☒ Claim(s) *10,18,32 and 40* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The amendment filed on 9/15/05 under 37 CFR 1.131 has been considered but is ineffective to overcome the Sato (U.S. Patent Number 6,532,309) reference.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 3, 4, 5, 6, 7, 16, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (U.S. Patent No. 6,532,309) in view of Feamster (an author of an article titled "Field-to-Frame Transcoding with Spatial and Temporal Downsampling").

2. Referring to claim 1; Sato discloses an image data converting apparatus for converting first compressed image data to second compressed image data being more compressed than the first compressed image data (column 1, lines 15-17), said first compressed image data being interlaced-scan (column 2, line 59) data compressed by orthogonal transform and motion compensation (column 1, line 38; Note: MPEG2 is listed in the application as satisfying these limitations), said apparatus comprising:

image data decoding means for decoding the first compressed image data by using only lower mth-order orthogonal transform coefficients included in nth-order orthogonal transform coefficients (where $m < n$) (column 2, lines 20-23), in both a vertical direction and a horizontal direction (figure 5) in the first compressed image data; thereby generating the second compressed image data; wherein the image data decoding means comprises compression inverse discrete-cosine transform means of a frame-discrete cosine transform mode, wherein the compression inverse discrete- cosine transform means of frame-discrete cosine transform mode performs the inverse discrete cosine transform by using a part of coefficients included in (4x8)th-order discrete cosine transform coefficients input to achieve the field-discrete compression inverse discrete cosine transform, while replacing remaining coefficients by 0's, thus discarding the remaining coefficients (column 18, lines 34-35, 42-47, 48-49, and 56-60).

Sato does not disclose an image data converting apparatus where the second compressed data being serial-scan data; and a scan-converting means for converting interlaced-scan data output from the image data decoding means to serial-scan data; and image data encoding means for encoding the serial-scan data, thereby generating the second compressed image data.

Feamster discloses an image data converting apparatus where the second compressed data being serial-scan data; and a scan-converting means for converting interlaced-scan data output from the image data decoding means to serial-scan data; and image data encoding means for encoding the serial-scan data, thereby generating

the second compressed image data (page 271, abstract, lines 1-4; page 273, section 5.2.1, lines 6-11).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the serial-scan portion of Feamster to Sato. The motivation for doing this would have been to make the output compatible with displaying on a computer monitor (computer monitors are usually progressive).

3. Referring to claim 2, Sato discloses an apparatus where the first compressed image data is MPEG2-image compressed data containing eighth-order discrete cosine transform coefficients in both the vertical direction and the horizontal direction, the image data decoding means is MPEG2-image data decoding means for decoding the MPEG2-image compressed data in both the vertical direction and the horizontal direction, by using only lower fourth-order coefficients included in the eighth-order discrete cosine transform coefficients (column 4, lines 6-9).

Sato does not disclose an apparatus where the image data encoding means is MPEG4-image encoding means for encoding the serial-scan data from the scan converting means, thereby generating MPEG4-image compressed data.

Feamster discloses an apparatus where the image data encoding means is MPEG4-image encoding means for encoding the serial-scan data from the scan converting means, thereby generating MPEG4-image compressed data (page 271, abstract, lines 5-6).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the MPEG4 encoding from Feamster to the apparatus disclosed in Sato. The motivation for doing this would have been to allow the transmission of MPEG program material over lower rate communication channels (Feamster: page 271, section 1, lines 13-14).

4. Referring to claim 3, Sato does not disclose an apparatus comprising picture-type determining means for determining a code type of each frame in the interlaced-scan MPEG2-image compressed data, for outputting data about an intra-image encoded image/forward prediction encoded image and for discarding data about a bi-directional prediction encoded image, thereby to convert a frame rate, wherein an output of the picture-type determining means is input to the MPEG2-image data decoding means.

Feamster discloses an apparatus comprising picture-type determining means for determining a code type of each frame in the interlaced-scan MPEG2-image compressed data, for outputting data about an intra-image encoded image/forward prediction encoded image and for discarding data about a bi-directional prediction encoded image, thereby to convert a frame rate, wherein an output of the picture-type determining means is input to the MPEG2-image data decoding means (page 272, column 2, lines 15-20).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to remove the B frames from the MPEG2 decoding apparatus disclosed in

Sato. The motivation for doing this would have been to reduce the processing requirements for MPEG decoding (Feamster: page 272, column 2, lines 26-27).

5. Referring to claim 4, Sato does not disclose an apparatus were the decoding means decodes only the intra-image encoded image/forward prediction encoded image.

Feamster discloses an apparatus were the decoding means decodes only the intra-image encoded image/forward prediction encoded image (page 272, column 2, lines 15-20).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to see that if you are removing the B frames from a MPEG2 data stream, that the apparatus would only decode the I and P frames.

6. Referring to claim 5, Sato discloses an apparatus where the MPEG2-image data decoding means comprises variable-length decoding means, and the variable-length decoding means performs variable-length encoding on only discrete cosine transform coefficients required in a discrete cosine transform, in accordance with whether a macro block the input MPEG2-image compressed data is of a field-discrete cosine transform mode or a frame-discrete cosine transform mode (figure 32).

7. Referring to claim 6, Sato discloses an apparatus where the MPEG2-image data decoding means comprises compression inverse discrete-cosine transform means of a field-discrete cosine transform mode, the compression inverse discrete-cosine

transform means extracts only the lower fourth-order coefficients included in the eighth-order discrete cosine transform coefficients in both the vertical direction and the horizontal direction, performs a fourth-order inverse discrete cosine transform on the lower fourth-order coefficients extracted (column 11, lines 37-39; figure 5).

Referring to claim 7, Sato discloses an apparatus where the inverse discrete-cosine transform is carried out in both the horizontal direction and the vertical direction by a method based on a predetermined fast algorithm (column 14, lines 37-41).

Referring to claims 16, Sato discloses an apparatus where the MPEG2-image data decoding means further comprises storage means for storing pixel values, and the motion-compensating means calculates coefficients equivalent to a sequence interpolating operation and applies the coefficients, thereby to perform motion compensation on the pixel values read from the storage means (column 12, lines 36-43).

Sato does not disclose an apparatus that uses the motion vector contained in the input MPEG2-image compressed data.

Feamster discloses an apparatus that uses the motion vector contained in the input MPEG2-image compressed data (page 273, section 5.1, lines 11-14).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the motion-vector importing apparatus from Feamster into the motion compensation unit disclosed in Sato. The motion for doing this would have

been to create a simple, computationally efficient transcoder (page 273, column 2, lines 1-2).

8. Referring to claims 21 and 22, Sato does not disclose an apparatus that comprises of a motion-vector compensation means for generating a motion vector value corresponding to the image data subjected to scan conversion, from a motion vector data contained in the input MPEG-image compressed data; and a motion-vector detecting means for detecting a high-precision motion vector from the motion vector value generated by the motion-vector synthesizing means.

Feamster discloses an apparatus that comprises of a motion-vector compensation means for generating a motion vector value corresponding to the image data subjected to scan conversion, from a motion vector data contained in the input MPEG-image compressed data; and a motion-vector detecting means for detecting a high-precision motion vector from the motion vector value generated by the motion-vector synthesizing means (page 273, section 5.1, lines 11-14, 17-25).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the motion-encoder from Feamster in the apparatus disclosed by Sato. The motivation for doing this would have been to create a simple, computationally efficient transcoder (page 273, column 2, lines 1-2).

9. Claims 11, 12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US Patent No. 6,532,309) in view of Feamster as applied to claims 1-7, 16, 21, and 22 above, and further in view of Sato (US Patent No. 6,748,018) (Note: from this point on Sato (US Patent No. 6,532,309) will be referred to as Sato1, and Sato (US Patent No. 6,748,018) will be referred to as Sato2).

Referring to claims 11 and 12, Sato1 and Feamster do not disclose an apparatus where the MPEG2-image data decoding means comprises motion-compensating means, wherein the motion-compensating means performs 1/4-precision pixel interpolation in both the horizontal direction and the vertical direction in accordance with a motion vector contained in the input MPEG2-image compressed data; by initially performs 1/2-precision pixel interpolation in the horizontal direction by using a twofold interpolation digital filter and then performs the 1/4-precision pixel interpolation by means of linear interpolation.

Sato2 discloses an apparatus where the MPEG2-image data decoding means comprises motion-compensating means, wherein the motion-compensating means performs 1/4-precision pixel interpolation in both the horizontal direction and the vertical direction in accordance with a motion vector contained in the input MPEG2-image compressed data; by initially performs 1/2-precision pixel interpolation in the horizontal direction by using a twofold interpolation digital filter and then performs the 1/4-precision pixel interpolation by means of linear interpolation (column 15, lines 35-44, 54, 58-61, 65-67).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the motion compensation unit from Sato2 in the apparatus disclosed in Sato1 and Feamster. The motivation for doing so would have been to allow for the motion compensation unit to perform high-speed processing (Sato2: column 15, lines 48-49).

10. Referring to claim 15, Sato1 and Feamster do not disclose an apparatus where the motion-compensating means includes a half-band digital filter for performing the pixel interpolation in both the horizontal-direction and the vertical direction.

Sato2 discloses an apparatus where the motion-compensating means includes a half-band digital filter for performing the pixel interpolation in both the horizontal-direction and the vertical direction (column 15, lines 43-44).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the motion compensation unit from Sato2 in the apparatus disclosed in Sato1 and Feamster. The motivation for doing so would have been to allow for the motion compensation unit to perform high-speed processing (Sato2: column 15, lines 48-49).

11. Claims 8, 9, 13, and 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato1 in view of Feamster as applied to claims 1-7, 16, 21, and 22 above, and further in view of Sato (US Patent No. 6,539,056) (Note: Sato (US Patent No. 6,539,056) will be referred to as Sato3 from this point on).

Referring to claims 8 and 9, Sato1 and Feamster do not disclose an apparatus where the MPEG2-image data decoding means comprises compression inverse discrete-cosine transform means of a frame-discrete cosine transform mode, wherein the compression inverse discrete-cosine transform means extracts only the lower fourth-order coefficients included in the eighth-order discrete cosine transform in the horizontal direction, performs fourth-order inverse discrete cosine transform on the lower fourth-order coefficients extracted, and performs a field-discrete cosine transform in the vertical direction; and where the inverse discrete-cosine transform is carried out in the horizontal direction and the vertical direction by a method based on a predetermined fast algorithm.

Sato3 discloses an apparatus where the MPEG2-image data decoding means comprises compression inverse discrete-cosine transform means of a frame-discrete cosine transform mode, wherein the compression inverse discrete-cosine transform means extracts only the lower fourth-order coefficients included in the eighth-order discrete cosine transform in the horizontal direction, performs fourth-order inverse discrete cosine transform on the lower fourth-order coefficients extracted, and performs a field-discrete cosine transform in the vertical direction (column 34, lines 47-51; Note: can be applied to a frame mode as frames are made up of fields); and where the inverse discrete-cosine transform is carried out in the horizontal direction and the vertical direction by a method based on a predetermined fast algorithm (column 18, line 25).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the IDCT unit from Sato3 in the apparatus disclosed by Sato1 and Feamster. The motivation for doing so would have been to prevent deterioration of the picture quality (column 34, lines 59).

Referring to claims 13 and 14, Sato1 and Feamster do not disclose an apparatus where the motion- compensating means initially performs 1/2-precision pixel interpolation in a field, as vertical interpolation by using a twofold interpolation digital filter, and then performs the 1/4-precision pixel interpolation in the field by means of linear interpolation, when a macro block of the input MPEG2-image compressed data is of a field or frame prediction mode.

Sato3 discloses an apparatus where the motion- compensating means initially performs 1/2-precision pixel interpolation in a field, as vertical interpolation by using a twofold interpolation digital filter, and then performs the 1/4-precision pixel interpolation in the field by means of linear interpolation, when a macro block of the input MPEG2-image compressed data is of a field prediction mode (column 33, lines 1-4).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the motion-compensation unit from Sato3 in the apparatus disclosed by Sato1 and Feamster. The motivation for doing so would have been to allow the motion-compensation unit to perform at high speed (column 33, lines 24-26).

Sato3 does not disclose an apparatus where the motion- compensating means initially performs 1/2-precision pixel interpolation in a field, as vertical interpolation by

using a twofold interpolation digital filter, and then performs the 1/4-precision pixel interpolation in the field by means of linear interpolation, when a macro block of the input MPEG2-image compressed data is of a frame prediction mode.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to note that a frame is made up of fields in an MPEG2 data stream, it would have been obvious to use the unit disclosed in Sato3 to perform in a frame mode.

12. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato1 in view of Feamster as applied to claim 1-7, 16, 21, and 22 above, and further in view of Boon.

Sato1 and Feamster do not disclose an apparatus where when pixel values outside an image frame are required to achieve twofold interpolation, the motion-compensating means performs one of a mirror process and a hold process, thereby generating a number of virtual pixel values equal to a number of taps provided in a filter in order to accomplish motion compensation, before performing the motion compensation.

Boon discloses an apparatus where when pixel values outside an image frame are required to achieve twofold interpolation, the motion-compensating means performs one of a mirror process and a hold process, thereby generating a number of virtual pixel values equal to a number of taps provided in a filter in order to accomplish motion compensation, before performing the motion compensation (column 20, lines 34-46 Note: the examiner is interpreting "and" in the art to mean the same as combine).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the mirror and hold apparatus from Boon to the apparatus disclosed by Sato1 and Feamster. The motivation for doing this would have been to use the extra pixels for performing interpolation using more pixel data.

13. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato1 in view of Feamster as applied to claims 1-7, 16, 21, and 22 above, and further in view of Ueno.

Feamster discloses an apparatus where the scan-converting means preserves one of a first field and a second field of the interlaced-scan image data output from the MPEG2-image data decoding means, discards the one of the first and second fields not preserved thereby converting the interlaced-scan data to serial-scan data.

Sato1 and Feamster do not disclose an apparatus that performs twofold up sampling on preserved pixel values.

Ueno discloses an apparatus that performs twofold up sampling on preserved pixel values (column 4, lines 54-57) (Note: from figure 14 in the application, twofold is being interpreted as equivalent to intra-field interpolation).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to perform the twofold up sampling from Ueno on the remaining field from Feamster. The motivation for doing this would have been to keep from having to reduce the image in the horizontal direction to correct the ratio of the image.

14. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato1 in view of Feamster as applied to claim1-7, 16, 21, and 22 above, and further in view of Satou.

Sato1 and Feamster do not disclose an apparatus where the MPEG2-image data decoding means has the function of encoding only a region composed of one or more macro blocks that surround an object in an intra-image encoded image/forward prediction encoded image.

Satou discloses an apparatus where the MPEG2-image data decoding means has the function of encoding only a region composed of one or more macro blocks that surround an object in an intra-image encoded image/forward prediction encoded image (column 17, lines 53-54; Note: The apparatus in Satou decodes only the macro blocks that surround the caption, which is being interpreted as an object).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the apparatus disclosed in Satou to the transcoding apparatus disclosed in Sato1 and Feamster. The motivation for doing this would have been to add the ability to transcode certain parts of the frame that don't change, without subjecting them to motion compensation therefore saving processing time.

15. Claims 23, 24, 25, 26, 27, 28, 29, 38, 43, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato1 in view of Feamster.

16. Referring to claim 23, Sato1 discloses an image data converting method of converting first compressed image data (column 1, lines 15-17) to second compressed

image data being more compressed than the first compressed image data, said first compressed image data being interlaced-scan (column 2, line 59) data compressed by orthogonal transform and motion compensation (column 1, line 38; Note: MPEG2 is listed in the application as satisfying these limitations), said method comprising the steps of: decoding the first compressed image data by using only lower mth-order orthogonal transform coefficients included in nth-order orthogonal transform coefficients (where m < n) (column 2, lines 20-23) in both a vertical direction and a horizontal (figure 5) direction in the first compressed image data; thereby generating the second compressed image data; wherein the step of decoding comprises performing compression inverse discrete-cosine transform of a frame-discrete cosine transform mode, wherein the compression inverse discrete- cosine transform of frame-discrete cosine transform mode performs the inverse discrete cosine transform by using a part of coefficients included in (4x8lth-order discrete cosine transform coefficients input to achieve the field-discrete compression inverse discrete cosine transform, while replacing remaining coefficients by 0's, thus discarding the remaining coefficients (column 18, lines 34-35, 42-47, 48-49, and 56-60).

Sato1 does not disclose an image data converting method where the second compressed data being serial-scan data; and a method for converting interlaced-scan data output from the step of decoding to serial-scan data, thereby generating the second compressed image data.

Feamster discloses an image data converting method where the second compressed data being serial-scan data; and a method for converting interlaced-scan

data output from the step of decoding to serial-scan data, thereby generating the second compressed image data (page 271, abstract, lines 1-4; page 273, section 5.2.1, lines 6-11).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the serial-scan method of Feamster to Sato1. The motivation for doing this would have been to make the output compatible with displaying on a computer monitor (computer monitors are usually progressive).

17. Referring to claim 24, Sato1 discloses a method where the first compressed image data is MPEG2-image compressed data containing eighth-order discrete cosine transform coefficients in both the vertical direction and the horizontal direction, the step of decoding the first compressed image data decodes the MPEG2-image compressed data in both the vertical direction and the horizontal direction, by using only lower fourth-order coefficients included the eighth-order discrete cosine transform coefficients (column 4, lines 6-9).

Sato1 does not disclose a method where the step of encoding the serial-scan data encodes the serial-scan data, thereby generating MPEG4-image compressed data.

Feamster discloses a method where the step of encoding the serial-scan data encodes the serial-scan data, thereby generating MPEG4-image compressed data (page 271, abstract, lines 5-6).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the MPEG4 encoding method from Feamster to the method

disclosed in Sato1. The motivation for doing this would have been to allow the transmission of MPEG program material over lower rate communication channels (Feamster: page 271, section 1, lines 13-14).

18. Referring to claim 25, Sato1 does not disclose a method where the code type of each frame in the interlaced-scan MPEG2-image compressed data is determined, data about an intra-image encoded image/forward prediction encoded image is output in accordance with the code type determined, data about a bi-directional prediction encoded image is discarded thereby to convert a frame rate, and the MPEG4-image compressed data is generated from the converted frame rate.

Feamster discloses a method where the code type of each frame in the interlaced-scan MPEG2-image compressed data is determined, data about an intra-image encoded image/forward prediction encoded image is output in accordance with the code type determined, data about a bi-directional prediction encoded image is discarded thereby to convert a frame rate, and the MPEG4-image compressed data is generated from the converted frame rate (page 272, column 2, lines 15-20).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to remove the B frames from the MPEG2 decoding method disclosed in Sato1. The motivation for doing this would have been to reduce the processing requirements for MPEG decoding (Feamster: page 272, column 2, lines 26-27).

19. Referring to claim 26, Sato1 does not disclose a method where only the intra-image encoded image/forward prediction encoded image is decoded in the step of decoding the MPEG2-image compressed data.

Feamster discloses a method where only the intra-image encoded image/forward prediction encoded image is decoded in the step of decoding the MPEG2-image compressed data (page 272, column 2, lines 15-20).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to see that if you are removing the B frames from a MPEG2 data stream, that the apparatus would only decode the I and P frames.

20. Referring to claim 27, Sato1 discloses a method where the step of decoding the MPEG2-image compressed data, variable-length decoding is performed on only the discrete cosine transform coefficients required in a discrete cosine transform, in accordance with whether a macro block of the input MPEG2-image compressed data is one of a field-discrete cosine transform mode and a frame-discrete cosine transform mode (figure 32).

21. Referring to claim 28, Sato1 discloses a method where the step of decoding the MPEG2-image compressed data, an inverse discrete-cosine transform of a field-discrete cosine transform mode is performed by extracting only the lower fourth-order coefficients included in eighth-order discrete cosine transform coefficients, in both the vertical direction and the horizontal direction, and then by performing fourth-order

inverse discrete cosine transform on the extracted lower fourth-order coefficients (column 11, lines 37-39, figure 5).

22. Referring to claim 29, Sato1 discloses a method where the inverse cosine transform is carried out in both the horizontal direction and the vertical direction, by a method based on a predetermined fast algorithm (column 14, lines 37-41).

23. Referring to claim 38, Sato1 discloses a method where the step of decoding the MPEG2-image compressed data, pixel values are stored, and in the step of performing motion compensation, coefficients already calculated and equivalent to a sequence interpolating operations are applied (column 12, lines 36-43).

Sato1 does not disclose a method that can perform motion compensation on the stored pixel values in accordance with the motion vector contained in the input MPEG2-image compressed data.

Feamster discloses a method that can perform motion compensation on the stored pixel values in accordance with the motion vector contained in the input MPEG2-image compressed data (page 273, section 5.1, lines 11-14).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the motion-vector importing method from Feamster into the motion compensation method disclosed in Sato1. The motivation for doing this would have been to create a simple, computationally efficient transcoder (page 273, column 2, lines 1-2).

24. Referring to claims 43 and 44, Sato1 does not disclose a method where a motion vector value corresponding to the image data subjected to scan conversion is synthesized from motion vector data contained in the input MPEG2-image compressed data; and a high-precision motion vector is detected from the motion vector value that has been synthesized.

Feamster discloses a method where a motion vector value corresponding to the image data subjected to scan conversion is synthesized from motion vector data contained in the input MPEG2-image compressed data; and a high-precision motion vector is detected from the motion vector value that has been synthesized (page 273, section 5.1, lines 11-14, 17-25).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the motion-encoding method from Feamster in the method disclosed by Sato1. The motivation for doing this would have been to create a simple, computationally efficient transcoder (page 273, column 2, lines 1-2).

25. Claims 33, 34, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato1 in view of Feamster as applied to claims 23-29, 43, and 44 above, and further in view of Sato2.

Referring to claims 33 and 34, Sato1 and Feamster do not disclose a method where in motion compensation performed in the step of decoding the MPEG2-image compressed data, 1/4-precision pixel interpolation is carried out in both the horizontal

direction and the vertical direction, in accordance with a motion vector contained in the input MPEG2-image compressed data; and the step of performing motion compensation, 1/2-precision pixel interpolation is initially performed in the horizontal direction by using a twofold interpolation digital filter and then 1/4-precision pixel interpolation is performed by means of linear interpolation.

Sato2 discloses a method where in motion compensation performed in the step of decoding the MPEG2-image compressed data, 1/4-precision pixel interpolation is carried out in both the horizontal direction and the vertical direction, in accordance with a motion vector contained in the input MPEG2-image compressed data; and the step of performing motion compensation, 1/2-precision pixel interpolation is initially performed in the horizontal direction by using a twofold interpolation digital filter and then 1/4-precision pixel interpolation is performed by means of linear interpolation (column 15, lines 35-44, 54, 58-61, 65-67).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the motion compensation method from Sato2 in the method disclosed in Sato1 and Feamster. The motivation for doing so would have been to allow for the motion compensation method to be performed at high-speed (Sato2: column 15, lines 48-49).

26. Referring to claim 37, Sato1 and Feamster do not disclose a method where the step of performing motion compensation, a half-band filter is used as the twofold interpolation digital filter, to perform the interpolation.

Sato2 discloses a method where the step of performing motion compensation, a half-band filter is used as the twofold interpolation digital filter, to perform the interpolation (column 15, lines 43-44).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the motion compensation method from Sato2 in the method disclosed in Sato1 and Feamster. The motivation for doing so would have been to allow for the motion compensation method to be performed at high-speed (Sato2: column 15, lines 48-49).

27. Claims 30, 31, 35, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato1 in view of Feamster as applied to claim 23-29, 43, and 44 above, and further in view of Sato3.

Referring to claims 30 and 31, Sato1 and Feamster do not disclose a method where the step of decoding the MPEG2-image compressed data, a compression inverse discrete-cosine transform of a frame-discrete cosine transform mode is performed by extracting only the lower fourth-order coefficients included in eighth-order discrete cosine transform coefficients and then fourth-order inverse discrete cosine transform is performed on the extracted lower fourth-order coefficients, in the horizontal direction, and field-discrete cosine transform is performed in the vertical direction; and where the inverse cosine transform is carried out in both the horizontal direction and the vertical direction, by a method based on a predetermined fast algorithm.

Sato3 discloses a method where the step of decoding the MPEG2-image compressed data, a compression inverse discrete-cosine transform of a frame-discrete cosine transform mode is performed by extracting only the lower fourth-order coefficients included in eighth-order discrete cosine transform coefficients and then fourth-order inverse discrete cosine transform is performed on the extracted lower fourth-order coefficients, in the horizontal direction, and field-discrete cosine transform is performed in the vertical direction (column 34, lines 47-51; Note: can be applied to a frame mode as frames are made up of fields); and where the inverse cosine transform is carried out in both the horizontal direction and the vertical direction, by a method based on a predetermined fast algorithm (column 18, line 25).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the IDCT method from Sato3 in the method disclosed by Sato1 and Feamster. The motivation for doing so would have been to prevent deterioration of the picture quality (column 34, lines 59).

Referring to claims 35 and 36, Sato1 and Feamster do not disclose a method where the step of performing motion compensation, 1/2-precision pixel interpolation is initially performed in a field, as vertical interpolation, by using a twofold interpolation digital filter, and then 1/4-precision pixel interpolation is performed in the field by means of linear interpolation, when a macro block of the input MPEG2-image compressed data is of a field prediction mode.

Sato3 discloses a method where the step of performing motion compensation, 1/2-precision pixel interpolation is initially performed in a field, as vertical interpolation, by using a twofold interpolation digital filter, and then 1/4-precision pixel interpolation is performed in the field by means of linear interpolation, when a macro block of the input MPEG2-image compressed data is of a field prediction mode (column 33, lines 1-4).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the motion-compensation method from Sato3 in the method disclosed by Sato1 and Feamster. The motivation for doing so would have been to allow for the motion compensation method to be performed at high-speed (column 33, lines 24-26).

Sato3 does not disclose a method where the step performing motion compensation, 1/2-precision pixel interpolation is initially performed in a field, as vertical interpolation, by using a twofold interpolation digital filter, and then the 1/4-precision pixel interpolation is performed in the field by means of linear interpolation, when A macro block of the input MPEG2-image compressed data is of a frame prediction mode.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to note that a frame is made up of fields in an MPEG2 data stream, it would have been obvious to use the method disclosed in Sato3 to perform in a frame mode.

Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato1 in view of Feamster as applied to claim 23-29, 43, and 44 above, and further in view of Boon.

Sato1 and Feamster do not disclose a method where when pixel values outside an image frame are required to achieve twofold interpolation, one of mirror process and a hold process is performed, thereby generating a number of virtual pixel values equal to a number of taps provided in a filter required in order to accomplish the motion compensation.

Boon discloses a method where when pixel values outside an image frame are required to achieve twofold interpolation, one of mirror process and a hold process is performed, thereby generating a number of virtual pixel values equal to a number of taps provided in a filter required in order to accomplish the motion compensation (column 20, lines 34-46; Note: the examiner is interpreting "and" in the art to mean the same as combine).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the mirror and hold steps from Boon to the method disclosed by Sato1 and Feamster. The motivation for doing this would have been to use the extra pixels for performing interpolation using more pixel data.

28. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato1 in view of Feamster as applied to claim 23-29, 43, and 44 above, and further in view of Ueno.

Feamster discloses a method where the step of converting, a first field or a second field of the interlaced-scan image data is preserved, and the one of the first and second fields that is not preserved is discarded, thereby converting the interlaced-scan data to serial-scan data, said first and second fields being contained in the MPEG2-image compressed data that has been decoded.

Sato1 and Feamster do not disclose a method where twofold up sampling is performed on preserved pixel values.

Ueno discloses a method where twofold up sampling is performed on preserved pixel values (column 4, lines 54-57) (Note: from figure 14 in the application, twofold is being interpreted as equivalent to intra-field interpolation).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to perform the twofold up sampling from Ueno on the remaining field from Feamster. The motivation for doing this would have been to keep from having to reduce the image in the horizontal direction to correct the ratio of the image.

29. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato1 in view of Feamster as applied to claim 23-29, 43, and 44 above, and further in view of Satou.

Sato1 and Feamster do not disclose a method where only a region composed of one or more macro blocks that surround an object in an intra-image encoded image/forward prediction encoded image is encoded in the step of decoding the MPEG2-image compressed data.

Satou disclose a method where only a region composed of one or more macro blocks that surround an object in an intra-image encoded image/forward prediction encoded image is encoded in the step of decoding the MPEG2-image compressed data (column 17, lines 53-54; Note: The apparatus in Satou decodes only the macro blocks that surround the caption, which is being interpreted as an object).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to add the method disclosed in Satou to the transcoding method disclosed in Sato1 and Feamster. The motivation for doing this would have been to add the ability to transcode certain parts of the frame that don't change, without subjecting them to motion compensation therefore saving processing time.

Allowable Subject Matter

30. Claims 10, 18, 32, and 40 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin E. Shepard whose telephone number is (571) 272-5967. The examiner can normally be reached on 8-5:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Kelley can be reached on (571) 272-7331. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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